MASSACHUSETTS STATE COLLEGE
UNITED STATES DEPARTMENT OF AGRICULTURE
AND COUNTY EXTENSION SERVICES IN AGRICULTURE AND HOME
ECONOMICS COOPERATING

A Summary of the Results Obtained From Two Year's Study of Oven Canning

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1. All of the heat-controlled, insulated gas and electric ovens tested differed widely in their behavior. Even with the heat controls set for the same temperature, foods canned in these ovens would vary considerably in the time they required to reach a maximum or an end temperature. For this reason it is impossible to make a time table for oven canning that will be effective for all ovens.

2. From tests made on twenty ovens results show great variations in ovens not only between different makes but between ovens of the same make. Under the same conditions the time required to bring the temperature from 112 deg. to 212 deg. in nine filled pint jars ranged from 37½ minutes to 120 minutes.

3. The gas oven was affected considerably by the size of the oven load. An increased load meant a decreased maximum oven temperature and a decrease in the rate of heat penetration into the jars.

4. The size of the oven load did not have such a noticeable effect upon the oven temperature and rate of heat penetration in the electric oven as it did in the gas oven. Although there were variations both in the oven temperatures and the rate of heat penetration, these could not always be correlated with the size of the oven load.

5. There was a difference of from 3 to 15 minutes in the time required by jars in the corner and in the center of the oven to reach the finish temperature. The rate of heat penetration was more rapid in the center jar with a 3-jar load and in the corner jar with a 6 or 9-jar load.

6. The effect of the position of a jar in the oven was influenced by the size of the load and, in the case of the electric oven, by the size of the drip pan used.

7. The size of the jar used is an important factor in determining the rate of heat penetration to the center of the jar.

8. There is a greater loss of liquid from jars processed in a 350 deg. oven than from those in a 275 deg. or a 250 deg. oven. The quality of the finished product is higher when a 275 deg. oven is used than when a 350 deg. oven is used.

9. The initial temperature of the jar's contents is an important factor in determining the length of time required to reach a maximum temperature.

10. The maximum temperature reached in unsealed jars of food processed in an oven is approximately 212°.

11. Preheating the oven, especially for loads no greater than 6 pint jars, is probably an unnecessary waste of time and fuel and can be eliminated by a small increase in the length of the processing period.

12. Oven processing has a greater deteriorating effect as measured by decreased elasticity upon rubber jar rings than does processing in either the hot water bath or the steam pressure cooker. Marked quality differences were noted among several kinds of jar rubbers used in canning.

13. The fuel consumption per jar was slightly greater for jars processed in the gas oven than for those processed in a water bath heated on the gas range. The fuel consumption per jar was 1/3 to 1/2 less for those processed in the electric oven than for those processed in a water bath heated on the electric range.

14. Data obtained during these studies indicate that many of the common spoilage organisms are not destroyed in jars of food subjected to the recommended oven processing periods.

15. The height of liquid was greater in the finished jars of foods canned in the gas oven than in foods canned in the electric oven.

16. The loss of liquid from jars in the electric oven seems to be due to a pumping action resulting from fluctuations in oven temperature. The maximum loss occurs at the time maximum temperature peaks occur in the oven.

17. The processing periods usually recommended for oven canning fall far short of the time required by oven-canned food to reach water bath temperature equivalents.

18. The loss of liquid from jars of oven canned food is objectionable not only from the standpoint of appearance and ease in handling but, as in the case of meat and some vegetables, from the standpoint of flavor and texture of the finished product.

19. The practice of completing the seal on the jars before processing in the oven proved to be highly dangerous and was not considered feasible. The rate of heat penetration into jars of food was greatly reduced when the jars were set in a shallow pan of hot water for oven processing. The maximum temperature attained in the oven itself was also greatly reduced by this method.

20. Oven canning is influenced by so many variable factors that it cannot be recommended as a safe method of food preservation.